

### **III. FUTURE CONDITIONS**

#### **FUTURE CONDITIONS WITHOUT NEW SITE DEVELOPMENT (TOTAL BACKGROUND SCENARIO)**

In order to evaluate the impact of the Waterside Mall PUD, an analysis of future traffic conditions without Waterside Mall was performed.

The Study Team evaluated future conditions taking into consideration growth in background traffic and traffic generated by new and proposed developments in the study area. The background traffic and other area development traffic were added to existing traffic counts to determine future traffic volumes without new development at Waterside Mall.

#### **BACKGROUND GROWTH**

The calculated growth rate used for background traffic was 1.0 percent per year. This rate accounts for regional growth as well as significant development growth in the area adjacent to the study area. All balanced traffic volumes were grown by this percentage to determine background traffic volumes for the years 2010 and 2022, the two analysis years selected by the Study Team.

#### **WATERSIDE MALL**

The majority of the existing office space at Waterside Mall is currently vacant. The future conditions without new development scenarios presented in this study assume that this space would not remain vacant if Waterside Mall is not redeveloped. Therefore, background conditions were analyzed assuming full occupancy of the unused one million square feet of existing office space at the Waterside Mall site.

#### **Trip Generation For Waterside Mall**

Trip generation for the currently unoccupied office space in the Waterside Mall was calculated based on the available land use information and applying trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (6<sup>th</sup> Edition). Additionally, the number of trips was adjusted to account for transit usage based on information found in “Development Related Ridership Survey II,” published by the Washington Metropolitan Area Transit Authority (WMATA). As Table 4 shows, filling up the existing vacant office space at the Waterside Mall will generate more than 450 vehicular trips during the peak hours and approximately 3,000 daily trips.

#### **Trip Distribution for Waterside Mall**

Trips generated by the existing vacant office space of Waterside Mall were distributed based on existing entrance and exit locations, and on existing traffic patterns.

**Table 4**  
**Summary of Trip Generation for Currently**  
**Vacant Waterside Mall Office Space**

Development	AM Peak Hour Trips			PM Peak Hour Trips			Daily Trips (two-way)
	IN	OUT	TOTAL	IN	OUT	TOTAL	
Waterside Mall Currently Vacant Office Space (1,000,000 sq. ft.)	1,028	140	1,168	204	996	1,200	7,779
<i>Transit Reduction = 61%</i>	<i>(627)</i>	<i>(85)</i>	<i>(712)</i>	<i>(124)</i>	<i>(607)</i>	<i>(731)</i>	<i>(4,745)</i>
<b>Net Waterside Mall Currently Vacant Office Space Trips</b>	<b>401</b>	<b>55</b>	<b>456</b>	<b>80</b>	<b>389</b>	<b>469</b>	<b>3,034</b>
Trip Generation information calculated based on ITE Code 710, General Office Building							

## OTHER AREA DEVELOPMENTS

Several developments in the vicinity of the study area are in the proposal, planning or construction stages. Traffic associated with these developments was analyzed and included in the future conditions scenario.

The boundaries used for other area developments in this study are as follows:

- North-south – Independence Avenue to Buzzards Point
- East-west – Washington Channel to 4<sup>th</sup> Street SE

Based on information provided by the District of Columbia Office of Planning, 15 developments in the area were identified. These developments, shown in Figure 16, are as follows:

1. Capital Park East – 422-unit multi-family rental development. Located at 301 G Street SW. Currently under construction.
2. Millennium Arts Center – 150,000 square foot studio arts center. Located at 65 I Street SW. Currently under construction.
3. Syphax School Housing – 41-unit single-family residential development. Located at Half and O Streets SW. Currently under construction.
4. Capitol Point – 750-unit multi-family residential development, with 1.35 million square feet of office development. Located at 2<sup>nd</sup> Street and Potomac Avenue SW. Currently in the planning stage.
5. Florida Rock II – 300-unit multi-family residential development. Located at South Capitol and S Streets SW. Currently in the planning stage.
6. Anacostia Waterfront Initiative (AWI) – Mixed-use development located along the current Water Street SW. The most current scenario calls for 800 residential units, a 300-room hotel, 217,000 square feet of retail space, and a 160,000 square foot museum at build-out. The expected level of development by 2010 is 560 residential units, 210 hotel rooms and 151,900 square feet of retail space.

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***16. Other Area Developments***

7. 20 M Street – 190,000 square foot office building planned for 20 M Street SE.
8. Arthur Capper-Carrollsborg – 1,500-unit planned residential development located on M Street SE between 3<sup>rd</sup> and 6<sup>th</sup> Streets. 800 units will be new construction, while the remaining 700 units are to be rehabilitated existing units.
9. Capitol Hill Towers – 342-unit planned residential development, located at L Street and New Jersey Avenue SE.
10. USDOT Headquarters – Relocation of the Department of Transportation headquarters to 3<sup>rd</sup> and M Streets SE. This building is expected to employ 5,500 people.
11. Federal Gateway – 297,000 square foot office building currently under construction at 140 M Street SE.
12. Florida Rock I – Mixed-use development, located at 100 Potomac Avenue SE, This development calls for 589,660 square feet of office space, 205 units of residential development, 55,000 square feet of retail space and a 600-room hotel.
13. Plaza of the Patriots – mixed-use development located at 4<sup>th</sup> and E Streets SW. Currently partially under construction. Current proposal calls for 300,000 square feet of office space and a 230-room hotel.
14. Potomac Place – Proposed 302-unit addition to currently existing residential development located at 800 4<sup>th</sup> Street SW.
15. Southeast Federal Center – Large, mixed-use development located between M Street and the Anacostia River in Southeast. Current proposals call for 2,900 residential units, 1,513,000 square feet of office space, 350,000 square feet of retail space, and a 100,000 square foot museum at build-out. The expected level of development by 2010 is 1,800 residential units, 713,000 square feet of office space, 160,000 square feet of retail space and 20,000 square feet of museum.

In addition to the developments listed above, Arena Stage, located at 6<sup>th</sup> and M Streets, is planning to undergo renovations. The proposed redevelopment at this site will generate only a marginal increase in peak hour traffic.

### **Trip Generation For Other Area Developments**

Table 5 summarizes AM and PM peak hour, and daily traffic volume forecasts for the other area developments analyzed in this study. The trips shown below are for the year 2022. AWI and Southeast Federal Center are expected to be partially complete by 2010, and built-out by 2022. Trip generation rates for area developments were calculated based on available land use information and applying trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (6<sup>th</sup> Edition). Additionally, the numbers of trips were adjusted to account for transit usage based on information found in “Development Related Ridership Survey II,” published by the Washington Metropolitan Area Transit Authority (WMATA). As the table indicates, the Southeast Federal Center and AWI, with their mixture of office, residential, retail and museum space, are expected to be the major traffic generators in the area.

**Table 5**  
**Summary of Trip Generation for Other Area Development<sup>1</sup>**

No.	Development	AM Peak Hour Trips			PM Peak Hour Trips			Daily Trips (two-way)
		IN	OUT	TOTAL	IN	OUT	TOTAL	
1	Capital Park East	34	179	213	166	82	248	2,664
	<i>Transit Reduction = 45%</i>	(15)	(81)	(96)	(75)	(37)	(112)	(1,200)
	Net Trips	19	98	117	91	45	136	1,464
2	Millennium Arts Center	131	67	198	89	173	262	
	<i>Transit Reduction = 42%</i>	(55)	(28)	(83)	(37)	(73)	(110)	
	Net Trips (See Note 2)	76	39	115	52	100	152	1,336 <sup>2</sup>
3	Syphax School Housing	10	29	39	31	17	48	456
	<i>Transit Reduction = 30%</i>	(3)	(9)	(12)	(9)	(5)	(14)	(136)
	Net Trips	7	20	27	22	12	34	320
4	Capitol Point							
	<i>Transit Reduction = 0%</i>							
	Net Trips	1,361	343	1,704	423	1,419	1,842	12,670
5	Florida Rock II							
	<i>Transit Reduction = 0%</i>							
	Net Trips	24	128	152	119	60	179	1,932
6	AWI <sup>4</sup>	245	570	815	1,025	1,028	2,053	21,190
	<i>Transit Reduction (varies<sup>1</sup>)</i>	(90)	(170)	(260)	(368)	(403)	(771)	(7,784)
	Net Trips	155	400	555	657	625	1,282	13,406
7	20 M Street	274	37	311	50	243	293	2,172
	<i>Transit Reduction = 61%</i>	(167)	(23)	(190)	(30)	(148)	(178)	(1,326)
	Net Trips	107	15	121	20	95	115	846
8	Arthur Capper- Carrollsborg	64	337	401	303	149	452	4,930
	<i>Transit Reduction = 50%</i>	(32)	(169)	(201)	(152)	(74)	(226)	(2,465)
	Net Trips	32	168	200	151	75	226	2,465
9	Capitol Hill Towers	28	145	173	137	67	204	2,184
	<i>Transit Reduction = 55%</i>	(15)	(80)	(95)	(75)	(37)	(112)	(1,202)
	Net Trips	13	65	78	62	30	92	982
10	DOT Headquarters	840	64	904	85	767	852	
	<i>Transit Reduction = 45%</i>	(378)	(29)	(407)	(38)	(345)	(383)	
	Net Trips	462	35	497	47	422	469	4,830 <sup>3</sup>
11	Federal Gateway	391	53	444	70	342	412	3,062
	<i>Transit Reduction = 61%</i>	(238)	(33)	(271)	(43)	(209)	(252)	(1,868)
	Net Trips	153	20	173	27	133	160	1,194
12	Florida Rock I	820	541	1361	549	863	1,412	13,782
	<i>Transit Reduction = 26%</i>	(213)	(140)	(353)	(43)	(209)	(252)	(3,584)
	Net Trips	607	401	1,008	506	654	1,160	10,198
13	Plaza of the Patriots	412	151	563	155	386	541	4,776
	<i>Transit Reduction (varies<sup>1</sup>)</i>	(171)	(52)	(223)	(55)	(157)	(212)	(1,802)
	Net Trips	241	99	340	100	229	329	2,974
14	Potomac Place	25	129	154	122	60	182	1,944
	<i>Transit Reduction = 46%</i>	(11)	(59)	(70)	(56)	(28)	(84)	(894)
	Net Trips	14	70	84	66	32	98	1,050

Table 5 (cont.)

15	SE Federal Center <sup>4</sup>	1,867	1,539	3,406	2,119	2,918	5,037	45,166
	<i>Transit Reduction (varies<sup>1</sup>)</i>	<i>(967)</i>	<i>(769)</i>	<i>(1,736)</i>	<i>(1,031)</i>	<i>(1,457)</i>	<i>(2,488)</i>	<i>(22,054)</i>
	Net Trips	900	770	1,670	1,088	1,461	2,549	23,112
<b>Total Other Area Development Traffic</b>		<b>4,171</b>	<b>2,671</b>	<b>6,842</b>	<b>3,431</b>	<b>5,392</b>	<b>8,823</b>	<b>72,613</b>

**Notes:**

1. The Table "Trip Generation For Area Development," included in Appendix G, presents more details on the square footage and number of units used in the calculations. It also presents detailed information on the ITE Trip Generation rates used in the calculations.
2. ITE provides no daily trip generation info for the land use chosen for Millennium Arts Center. The daily trips generated by Millennium Arts Center were estimated by averaging the AM and PM peak hours and using the standard engineering practice of the peak hour representing 10 percent of total daily volume.
3. Trip Generation for the USDOT headquarters was provided by the engineer for this project, and no daily trip generation was provided. The same methodology described in Note 2 was used to calculate the estimated daily trips that will be generated by the USDOT site.
4. This table shows the estimated number of trips for AWI and the Southeast Federal Center at build-out (2022). The number of estimated trips for the 2010 interim year are presented in Appendix G.

**Trip Distributions for Other Area Developments**

In order to distribute trips for other area developments, major regional population and employment centers were determined. Based on these locations, anticipated expressway and arterial routes were determined for the other area developments, and trips were distributed based on these anticipated routes. A significant proportion of the other area development traffic is expected to pass through the Waterside Mall study area. Separate trip distributions were developed for residential and commercial development. The greatest percentage of traffic enters and exits the study area via M Street/Maine Avenue, with a considerable amount of traffic entering and exiting via 4<sup>th</sup> and 7<sup>th</sup> Streets. Detailed distributions used for other area development traffic can be found in Appendix H.

**TRIP ASSIGNMENTS FOR OTHER AREA DEVELOPMENTS AND EXISTING WATERSIDE MALL**

The projected year 2010 and 2022 background trip assignments at each of the study area intersections were estimated by combining:

1. Trip assignments for the developments listed in Table 5
2. Full occupancy of the existing Waterside Mall office space
3. Existing traffic volumes increased by the one percent per-year growth rate.

Figure 17 shows anticipated 2010 volumes, while Figure 18 shows expected 2022 volumes with growth in background traffic and the addition of area developments. When compared to existing traffic volumes, the individual volume increases at each intersection can be seen.

Overall, AM peak hour traffic is expected to increase by 52.5 percent between 2002 and 2010 and by 71.0 percent by 2022. PM peak hour traffic is expected to increase by 63.9 percent in between 2002 and 2010 and by 91.0 percent by 2022. Most of the increase in traffic is due to the additional trips generated by the developments listed on Table 5.

## **PEDESTRIAN MOVEMENTS**

Along with the increase in traffic associated with development in the vicinity of the Waterside Mall, as well as the anticipated full occupancy of the Waterside Mall office space, an increase in pedestrian traffic is anticipated. An annual increase in pedestrian volume of 4.0 percent was used. The Study Team calculated this annual increase based on the calculated annual increase in traffic volumes for the 2022 scenario.

## **LEVELS OF SERVICE WITH BACKGROUND TRAFFIC**

Using the SYNCHRO traffic analysis software, the Study Team evaluated traffic conditions at the eight intersections in the study area for future conditions with background traffic. SimTraffic, SYNCHRO's associated traffic simulation software, was used to assist in the development of a model depicting expected future traffic conditions with background traffic.

In the course of the initial 2010 scenario modeling, SimTraffic indicated conditions of gridlock throughout the network due to the impacts of the traffic generated by the developments listed in Table 5 on eastbound I Street. Thus, the Study Team modeled I Street with two eastbound lanes to address these gridlock conditions. Currently, there is metered parking along eastbound I Street between 6<sup>th</sup> and 3<sup>rd</sup> Streets. Field observations indicate that this parking is little used during the peak periods. All SimTraffic future scenarios were modeled with two eastbound through lanes on I Street, between 6<sup>th</sup> and 3<sup>rd</sup> Streets. At 3<sup>rd</sup> Street, the curb lane was modeled as an exclusive right turn lane.

The Study Team used the SimTraffic results to calculate LOS and the delay per vehicle for the intersections in the study area. Table 6 compares the levels of service and delay per vehicle for existing traffic conditions and for future background and other area development traffic during the AM and PM peak hours.

Traffic conditions at all of the intersections degrade in the 2010 model and further degrade in the 2022 model. As Table 6 indicates, with the background growth, other area developments and filling-in of the vacant office space at the Waterside Mall, most study area intersections are expected to operate at acceptable levels of service during the AM peak hour for the year 2010, with the exceptions of 3<sup>rd</sup> and 4<sup>th</sup> Streets with I Street, which are expected to operate at LOS F. However, without improvements, traffic conditions at

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***17. Total Background (2010) AM and PM Peak Hour Volumes***



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*18. Total Background (2022) AM and PM Peak Hour Volumes*

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***Table 6. Level of Service and Delay per Vehicle Comparison – Existing  
Conditions, 2010 Total Background and Other Area Developments, 2022  
Total Background and Other Area Developments***

these intersections are expected to degrade significantly during the 2010 PM peak hour. The intersections of 3<sup>rd</sup> and 4<sup>th</sup> Streets with I Street, and 3<sup>rd</sup> and 7<sup>th</sup> Streets with M Street/Maine Avenue are expected to operate at LOS F during the 2010 PM peak hour.

For the year 2022, the intersections of 3<sup>rd</sup> and 4<sup>th</sup> Streets with I Street are expected to operate at LOS F during the AM peak hour and most of the intersections included in the analysis are expected to operate at LOS F during the PM peak hour. This level of service indicates that even without the PUD level of redevelopment of Waterside Mall, transportation improvements should be put in place prior to 2010 to accommodate the substantial growth in background traffic and to accommodate the needs of other area development traffic.

### **FUTURE CONDITIONS WITH SITE DEVELOPMENT AND WITHOUT 4<sup>TH</sup> STREET VEHICULAR CONNECTION**

The Study Team evaluated future conditions with site traffic under five scenarios. The first two scenarios analyzed traffic in the years 2010 and 2022 (the interim phase and the projected build-out year for Waterside Mall) without a vehicular connection of 4<sup>th</sup> Street between I and M Streets. These scenarios assumed that 4<sup>th</sup> Street would be constructed as a pedestrian promenade between I and M Streets, with vehicular traffic prohibited. The next two scenarios analyzed traffic with a 4<sup>th</sup> Street connection for the years 2010 and 2022. The fifth scenario analyzed the redevelopment project assuming that connections from M Street to I Street would be provided along service roads at the western and eastern ends of the Waterside Mall development instead of along a 4<sup>th</sup> Street connector.

### **SITE TRAFFIC TRIP GENERATION**

In order to gain an understanding of the impact of the traffic that would be generated by the PUD application for Waterside Mall, the land uses and associated trips generated by a “by-right” (allowable under current zoning) development were determined.

The Mall site includes Square 542, Lot 88 and Square 499, Lot 60, encompassing a total area of 584,656 square feet. The existing C-3-B zoning allows development up to a floor area ratio (FAR) of 5.0, with up to 4.0 FAR of an allowable nonresidential use. Based on this information, the property could be developed with approximately 2,923,300 square feet of construction, possibly consisting of:

- Up to 2,923,300 square feet (5.0 FAR) of residential uses representing approximately 2,923 apartments with average floor areas of 1,000 square feet;
- From 584,700 square feet (1.0 FAR) to 2,338,600 square feet (4.0 FAR) of retail and service uses, with the remaining floor area in residential use;
- From 584,700 square feet (1.0 FAR) to 2,338,600 square feet (4.0 FAR) of office uses, with the remaining floor area in residential use; and
- Any other combination of allowable residential and nonresidential uses.

The PUD level of development used in the estimation of site trips was based on PUD application information provided to the Study Team by the developer. As shown in Table 7, in the year 2010, the Waterside Mall PUD is expected to have a total of 1.6935 million square feet of office space, or 82.6 percent of the projected total office space at build-out of 2.0515 million square feet. 75,000 square feet of retail space will be provided, or 100 percent of the anticipated total at build-out. Finally, 200 apartment units will be complete, or 50 percent of the projected 400 units expected to be constructed at build-out. The PUD redevelopment proposal does not utilize the maximum allowable FAR. The existing 30,000 square foot supermarket will remain unchanged, and therefore was not included in the calculation of new trips. However, the 75,000 square feet of retail space is a reduction of 29,500 square feet from the existing 104,500 square feet of retail space at Waterside Mall. Only 117,500 square feet of the existing office space is currently occupied.

Trips for both scenarios were calculated based on the ITE Trip Generation Manual, 6<sup>th</sup> Edition. Net trips were calculated by subtracting the number of trips generated by the existing land uses from the number of trips generated by the proposed usage. Transit reduction rates were based on information provided in “Development Related Ridership Survey II,” published by WMATA. Trips were generated for the by-right scenario for comparison purposes only. No traffic modeling was performed with trips generated under the by-right scenario.

**Table 7**  
**Summary of Development Levels**

Land Use	Existing	By-Right <sup>1</sup>	2010 PUD	2022 PUD
Office	1,117,500 Sq. Ft. <sup>2</sup>	1,754,100 Sq. Ft.	1,693,500 Sq. Ft.	2,051,500 Sq. Ft.
Retail	104,500 Sq. Ft.	554,700 Sq. Ft.	75,000 Sq. Ft.	75,000 Sq. Ft.
Residential	0 Units	584 Units	200 Units	400 Units
Supermarket	30,000 Sq. Ft.	30,000 Sq. Ft.	30,000 Sq. Ft.	30,000 Sq. Ft.
<sup>1</sup> Likely scenario based on existing zoning. The by-right scenario represents the maximum level of development that may be constructed with the existing zoning. However, based on the PUD application, it is highly unlikely that the property would be developed at the by-right levels. <sup>2</sup> 1,000,000 Sq. Ft. of existing office space is vacant.				

Tables 8 and 9 show the net trip generation information for the proposed PUD level of development for the years 2010 and 2022, respectively. Detailed trip generation information for Waterside Mall, including by-right trip generation for three possible scenarios, is presented in Appendix I.

As shown in Table 10, when compared to full occupancy of the existing vacant office space at Waterside Mall, the proposed PUD redevelopment is expected to generate 170 additional AM peak hour trips in 2010; 319 additional AM peak hour trips in 2022; 209 additional PM peak hour trips in 2010; and 414 additional PM peak hour trips in 2022. The number of daily trips generated by the 1,000,000 square feet of vacant office space is 700 less than the number of daily trips generated by the redeveloped site in the year 2010.

**Table 8**  
**Summary of 2010 Trip Generation for Site – PUD Level of Development**

		AM Peak Hour Trips			PM Peak Hour Trips			Daily Trips (two-way)
Land Use		IN	OUT	TOTAL	IN	OUT	TOTAL	
A	Proposed Total New Office - 1,693,500 SF <i>Transit Reduction = 61%</i> Net Trips	1,565 (955) 610	213 (130) 83	1,778 (1,085) 693	336 (205) 131	1,641 (1,001) 640	1,977 (1,206) 771	11,658 (7,112) 4,546
B	Existing Occupied Office - 117,500 SF <i>Transit Reduction = 61%</i> Net Trips	(187) (114) (73)	(25) (15) (10)	(212) (129) (83)	(36) (22) (14)	(175) (107) (68)	(211) (129) (82)	(1,502) (916) (586)
C	Net New Office Trips (A – B)	537	73	610	117	572	689	3,960
D	Proposed Retail – 75,000 SF <i>Transit Reduction = 46%</i> Net Trips	82 (38) 44	52 (24) 28	134 (62) 72	93 (43) 50	101 (46) 55	194 (89) 105	3,050 (1,402) 1,648
E	Existing Retail – 104,500 SF <i>Transit Reduction = 46%</i> Net Trips	(100) (46) (54)	(64) (29) (35)	(164) (75) (89)	(130) (60) (70)	(141) (65) (76)	(271) (125) (146)	(4,250) (1,954) (2,296)
F	Net New Retail Trips (D – E)	(10)	(7)	(17)	(20)	(21)	(41)	(648)
G	Proposed Residential (200 units) <i>Transit Reduction = 67%</i> Net Trips	16 (11) 5	86 (58) 28	102 (69) 33	85 (57) 28	42 (28) 14	127 (85) 42	1,332 (892) 440
H	Net New Commercial Trips (C + F)	527	66	593	97	551	638	3,312
I	Net New Residential Trips (G)	5	28	33	28	14	40	420
J	Net New Total Trips (H + I)	532	94	626	125	565	678	3732
<b>Note:</b> Detailed trip generation information for W at erside M all is presented in Appendix I.								

**Table 9**  
**Summary of 2022 Trip Generation for Site – PUD Level of Development**

		AM Peak Hour Trips			PM Peak Hour Trips			Daily Trips (two-way)
Land Use		IN	OUT	TOTAL	IN	OUT	TOTAL	
A	Proposed Total New Office – 2,051,500 SF <i>Transit Reduction = 61%</i> Net Trips	1,823 (1,112) 711	249 (152) 97	2,072 (1,264) 808	404 (246) 158	1,975 (1,205) 770	2,379 (1,451) 928	13,508 (8,240) 5,268
B	Existing Occupied Office – 117,500 SF <i>Transit Reduction = 61%</i> Net Trips	(187) (114) (73)	(25) (15) (10)	(212) (129) (83)	(36) (22) (14)	(175) (107) (68)	(211) (129) (82)	(1,502) (916) (586)
C	Net New Office Trips (A – B)	638	87	725	144	702	846	4,682
D	Proposed Retail – 75,000 SF <i>Transit Reduction = 46%</i> Net Trips	82 (38) 44	52 (24) 28	134 (62) 72	93 (43) 50	101 (46) 55	194 (89) 105	3,050 (1,402) 1,648
E	Existing Retail – 104,500 SF <i>Transit Reduction = 46%</i> Net Trips	(100) (46) (54)	(64) (29) (35)	(164) (75) (89)	(130) (60) (70)	(141) (65) (76)	(271) (125) (146)	(4,250) (1,954) (2,296)
F	Net New Retail Trips (D – E)	(10)	(7)	(17)	(20)	(21)	(41)	(648)
G	Proposed Residential (400 units) <i>Transit Reduction = 67%</i> Net Trips	32 (21) 11	170 (114) 56	202 (135) 67	158 (106) 52	78 (52) 26	236 (158) 78	2,532 (1,696) 836
H	Net New Commercial Trips (C + F)	628	80	708	124	681	805	4,034
I	Net New Residential Trips (G)	11	56	67	52	26	78	836
J	Net New Total Trips (H + I)	639	136	775	176	707	883	4,870
<b>Note:</b> Detailed trip generation information for Waterside Mall is presented in Appendix I.								

**Table 10**  
**Total Site Trips Comparison**

Level of Development	AM Peak Hour Net Trips			PM Peak Hour Net Trips			Daily Trips (two-way)
	IN	OUT	TOTAL	IN	OUT	TOTAL	
Net Waterside Mall Existing Vacant Office Space Trips (1,000,000 SF)	401	55	456	80	389	469	3,034
By-right Net New Trips (1,754,100 SF Office, 584 Apartment Units, 554,700 SF Retail, 30,000 SF Supermarket)	815	277	1,092	679	1,194	1,873	19,860
2010 PUD Net New Trips (1,693,500 SF Office, 75,000 SF Retail, 200 Apartment Units)	532	94	626	125	565	678	3,732
2022 PUD Net New Trips (2,100,500 SF Office, 75,000 SF Retail, 400 Apartment Units)	639	136	775	176	707	883	4,870
<b>Note:</b> Detailed trip generation information for Waterside Mall is presented in Appendix I.							

When compared to the likely by-right scenario, the proposed 2022 PUD level of development is expected to generate 317 fewer trips during the AM peak hour; 990 fewer trips during the PM peak hour; and 14,990 fewer daily trips. Other possible by-right scenarios would generate a wide range of trips. For example, the scenario consisting solely of 2,923 residential units would be expected to contribute approximately 5,800 total trips, which is approximately 930 more than what is expected in 2022 under the PUD application. Finally, the scenario with 2,338,600 square feet of retail space and 584 apartment units would be expected to generate over 29,000 daily trips, a number far greater than anticipated by the PUD level of development<sup>1</sup>.

### TRIP DISTRIBUTIONS FOR SITE DEVELOPMENTS

As with the other area developments, in order to distribute the generated trips for the PUD development, major regional population and employment centers were determined. Based on these locations, anticipated expressway and arterial routes were determined for the other area developments, and trips were distributed based on these anticipated routes.

<sup>1</sup> The by-right scenario represents the maximum level of development that may be constructed with the existing zoning. However, based on the PUD application, it is highly unlikely that the property would be developed at the by-right levels. The trip generation of the by-right scenario is presented in this report to provide a comparison between the trips generated by the PUD level of development in the PUD and the maximum level of development that may be constructed with the existing zoning.

Unlike the other area developments, all trips associated with the Waterside Mall PUD originate or terminate within the study area. Separate trip distributions were developed for residential and commercial development for the 2010 and 2022 scenarios. Commercial and residential site traffic distributions are presented in Figures 19 and 20, respectively. It can be seen that the greatest percentage of traffic entering and exiting the site is via M Street/Maine Avenue, while a considerable amount of traffic enters and exits the site via 4<sup>th</sup> and 7<sup>th</sup> Streets.

## **TRIP ASSIGNMENTS FOR SITE DEVELOPMENTS**

The Study Team assigned the site trips generated by the Waterside Mall PUD to the study area network using the distributions shown in Figures 19 and 20. The estimated future year trip assignments for the scenario without the 4<sup>th</sup> Street connection are summarized in Figures 21 and 22. For site access, three main entry/exit points were used.

The developer proposes two full-movement driveways for M Street, as shown in Figure 23. One driveway is proposed between 3<sup>rd</sup> and 4<sup>th</sup> Streets, while the other is proposed between 4<sup>th</sup> and 6<sup>th</sup> Streets. Median breaks on M Street would be necessary for these driveways. The third major access point is on K Street/Makemie Place. A relatively small number of trips were assigned to the driveway on K Street/Wesley Place.

The addition of traffic volumes at the intersections increases with proximity to the proposed Waterside Mall driveway locations. M Street is expected to see the greatest overall increase in site traffic of all the studied intersections, with up to 168 trips added during the 2010 AM peak hour and 190 trips during the 2010 PM peak hour. When Waterside Mall is fully redeveloped in 2022, these numbers will increase during the AM and PM peak hours to 217 and 246, respectively. Of the studied intersections on I Street, the intersection of 6<sup>th</sup> and I Streets will see the largest amount of site trips, with 175 during the 2010 AM peak hour and 197 during the 2010 PM peak hour. In 2022, the AM and PM peak hour site traffic volumes are expected to increase to 225 and 256, respectively. 3<sup>rd</sup> Street between I and M Streets will see an increase of 71 vehicles during the 2010 AM peak and 81 vehicles during the 2010 PM peak. These numbers will increase with full development of Waterside Mall in 2022. 6<sup>th</sup> Street between I and M Street will see a similar increase in traffic generated by the site.

## **TOTAL TRIP ASSIGNMENTS WITH SITE DEVELOPMENT**

In order to forecast the total number of vehicular trips that are expected to traverse the study area intersections during the forecast years of 2010 and 2022, the Study Team added the following layers of traffic volumes:

1. Existing traffic
2. Growth in background traffic
3. Trips generated by other area development
4. PUD site traffic



**SELECT TO VIEW:**

***19. Site Distribution for Residential Development without 4<sup>th</sup> Street Connection***

**SELECT TO VIEW:**

***20. Site Distribution for Commercial Development without 4<sup>th</sup> Street Connection***

**SELECT TO VIEW:**

*21. Site Traffic for 2010 without 4<sup>th</sup> Street Connection*

**SELECT TO VIEW:**

*22. Site Traffic for 2022 without 4<sup>th</sup> Street Connection*

**SELECT TO VIEW:**

***23. Future/Proposed Peak Period Lane Configurations without 4<sup>th</sup> Street***

Note that the existing, currently vacant office space of Waterside Mall was not used in this scenario. This scenario assumes that Waterside Mall will be developed as shown in Table 7. Figures 24 and 25 show total volumes for site development without a vehicular connection of 4<sup>th</sup> Street for 2010 and 2022, respectively.

## SITE IMPACTS

The Study Team evaluated the impacts of the PUD development traffic on the study area intersections. The site impacts indicate what proportion of the forecast total traffic at a particular intersection is generated by new site traffic. The Study Team calculated the site impacts by dividing the additional PUD-generated traffic by the total forecast traffic at each intersection.

Site impacts of less than five percent are low and generally reflect negligible effects on traffic operations and delays. Site impacts between five and 15 percent are moderate and minor effects on traffic operations and delays are expected at intersections with site impacts at these levels. Site impacts of more than 15 percent are significant and generally result in significant degradation of traffic operations and increased delays. The intersections most affected by the site traffic are those located in the immediate vicinity of the site. Site impacts generally decrease with increased distance to the site that generates the trips.

Table 11 shows that the intersections of I Street with 6<sup>th</sup> and 7<sup>th</sup> Streets will be impacted the most by site traffic. Site traffic is expected to have a significant impact on the intersection of 6<sup>th</sup> and I Streets. A large portion of site traffic is expected to pass through this intersection. While the impact at 7<sup>th</sup> and I Streets is in the moderate range, this intersection experiences the second highest impact of the studied intersections. Of the remaining intersections, 4<sup>th</sup> and I, 7<sup>th</sup> and Maine and 3<sup>rd</sup> & M are expected to experience a change in impact from 2010 to 2022 – increasing from low to moderate impact. All other studied intersections are expected to experience a low level of impact in 2010 and 2022.

**Table 11**  
***Impact of Site Traffic on Area Intersections without 4<sup>th</sup> Street Connection***

Intersection	2010 AM Peak Hour	2022 AM Peak Hour	2010 PM Peak Hour	2022 PM Peak Hour
	Site Impact	Site Impact	Site Impact	Site Impact
1. 3 <sup>rd</sup> and I Streets	3%	4%	3%	3%
2. 4 <sup>th</sup> and I Streets	4%	5%	4%	4%
3. 6 <sup>th</sup> and I Streets	16%	18%	14%	15%
4. 7 <sup>th</sup> and I Streets	10%	12%	9%	10%
5. 7 <sup>th</sup> Street and Maine Avenue	4%	5%	4%	4%
6. 6 <sup>th</sup> and M Streets	3%	3%	3%	3%
7. 4 <sup>th</sup> and M Streets	3%	3%	3%	3%
8. 3 <sup>rd</sup> and M Streets	4%	5%	5%	5%

**SELECT TO VIEW:**

***24. Total (2010) AM and PM Peak Hour Volumes without 4<sup>th</sup> Street Connection***

**SELECT TO VIEW:**

***25. Total (2022) AM and PM Peak Hour Volumes without 4<sup>th</sup> Street Connection***



## **PEDESTRIAN MOVEMENTS**

Along with the increase in traffic the redevelopment of Waterside Mall, an increase in pedestrian traffic is anticipated. Based on projected development growth, the Study Team calculated that pedestrian traffic is expected to increase at a rate of 4.1 percent per year. This scenario, with a pedestrian connection and no vehicular connection along 4<sup>th</sup> Street between M and I Streets, would be the safest for pedestrians. Without vehicles on the proposed 4<sup>th</sup> Street connection, there would be no conflicts between pedestrians and vehicles.

## **FUTURE LEVELS OF SERVICE WITH SITE DEVELOPMENT WITHOUT 4<sup>TH</sup> STREET CONNECTION**

As stated above, the two analysis years used in this study are 2010 and 2022. The year 2022 is the build-out year for Waterside Mall. Levels of service were calculated using the trips generated and assigned for the appropriate levels of development at each of these years.

In the course of the initial 2010 scenario modeling, SimTraffic indicated conditions of gridlock throughout the network due to site traffic added along eastbound I Street. Thus, the Study Team modeled I Street with two eastbound lanes to address the gridlock conditions. Currently, there is metered parking along eastbound I Street between 6<sup>th</sup> and 3<sup>rd</sup> Streets. Field observations indicate that this parking is little used during the peak periods. All SimTraffic scenarios with redevelopment at the site were modeled with two eastbound through lanes on I Street, between 6<sup>th</sup> and 3<sup>rd</sup> Streets. At 3<sup>rd</sup> Street, the curb lane was modeled as an exclusive right turn lane.

The Study Team used the SimTraffic results to calculate LOS and the delay per vehicle for the intersections in the study area. Table 12 compares the levels of service and delay per vehicle for existing traffic conditions and for total traffic conditions without the 4<sup>th</sup> Street connection for the years 2010 and 2022.

As noted above, without improvements, the study area intersections would operate at gridlock conditions during the peak hours. Nevertheless, even with the I Street improvement, the intersections of 3<sup>rd</sup> and 4<sup>th</sup> Streets with I Street are expected to operate at LOS F during the AM and PM peak hours for the years 2010 and 2022. The poor operation of these intersections is primarily attributed to motorists passing through the study area who must use I and 3<sup>rd</sup> Streets to access M Street or the southern portion of 4<sup>th</sup> Street. By 2022, even with the improvements on I Street, several intersections are expected to operate at LOS F during the PM peak hour. The intersections that are expected to operate at LOS F during the PM peak hour for the 2022 scenario are 3<sup>rd</sup> Street and I Street, 4<sup>th</sup> Street and I Street, 7<sup>th</sup> Street and Maine Avenue, 4<sup>th</sup> Street and M Street and 3<sup>rd</sup> Street and M Street. Thus, additional improvements would be needed to accommodate the 2010 and 2022 PUD levels of development at the Waterside Mall with a scenario that does not include a vehicular connection along 4<sup>th</sup> Street between M and I Streets.

**SELECT TO VIEW:**

***Table 12. Level of Service and Delay per Vehicle Comparison – Existing Conditions, 2010 Total Traffic, and 2022 Total Traffic – Without 4th Street Vehicular Connection***

## **FUTURE CONDITIONS WITH SITE DEVELOPMENT AND WITH 4<sup>TH</sup> STREET CONNECTION**

The next alternative analyzed by the Study Team establishes a vehicular connection of 4<sup>th</sup> Street between I and M Streets. The developer has proposed a 55-foot cross-section. 4<sup>th</sup> Street is proposed to be five lanes wide. The curb lanes are to be used as parking lanes, there is to be one travel lane in each direction, while the center lane is proposed to be used for left turn bays.

As shown in Figure 26, at the intersection of 4<sup>th</sup> and M Streets, southbound 4<sup>th</sup> Street is proposed to have three approach lanes: an exclusive left turn lane, a shared left/through lane, and an exclusive right turn lane. This approach configuration is necessary due to the Waterfront Metro station skewing the geometry of the proposed intersection. The Study Team evaluated future conditions with a 4<sup>th</sup> Street vehicular connection for the AM and PM peak hours of the years 2010 and 2022.

### **SITE TRAFFIC TRIP GENERATION**

There is no change in site traffic trip generation under this scenario from the scenario without a 4<sup>th</sup> Street connection. Tables 8 and 9 show the net trip generation information for the proposed PUD site development for the years 2010 and 2022, respectively. Detailed trip generation information for Waterside Mall is presented in Appendix I.

### **TRIP DISTRIBUTIONS FOR SITE DEVELOPMENTS**

Trip distribution at the entry and exit points to the study area for site traffic under this scenario is the same as the scenario without the proposed 4<sup>th</sup> Street vehicular connection. All site traffic is assumed to enter the study area via the same routes with or without this vehicular connection. Figures 27 and 28 show these distributions. The distributions within the study area are different with the 4<sup>th</sup> Street vehicular connection.

Furthermore, there are differences in the distributions of both existing traffic and traffic associated with other area developments. The construction of 4<sup>th</sup> Street would provide an alternate route through the study area, reducing the need for vehicles to use I and 3<sup>rd</sup> Streets to access 4<sup>th</sup> and M Streets. In addition to diversions of a number of existing trips through the proposed 4<sup>th</sup> Street connection, some of the other area development trips would also be diverted to make use of the 4<sup>th</sup> Street connection. Trip distributions for other area developments under this scenario can be found in Appendix J.

### **TRIP ASSIGNMENTS FOR SITE DEVELOPMENTS**

Site trip assignments are different with the proposed 4<sup>th</sup> Street connection. As Figure 26 indicates, under this scenario, in addition to the two full-movement driveways proposed for M Street, two driveways are proposed for the 4<sup>th</sup> Street connection. One driveway is proposed to be approximately 270 feet north of M Street. This driveway would serve only the western portion of Waterside Mall and would therefore create a three-leg

**SELECT TO VIEW:**

***26. Future/Proposed Peak Period Lane Configurations with 4<sup>th</sup> Street***

**SELECT TO VIEW:**

***27. Site Distribution for Residential Development with 4<sup>th</sup> Street Connection***

**SELECT TO VIEW:**

*28. Site Distribution for Commercial Development with 4<sup>th</sup> Street Connection*

intersection with 4<sup>th</sup> Street. The second driveway is proposed approximately 300 feet north of the first driveway. This full-movement driveway would serve both sides of Waterside Mall and would create a four-leg intersection with 4<sup>th</sup> Street.

The proposed vehicular connection of 4<sup>th</sup> Street, along with its two proposed driveways, reduces the amount of traffic that is expected to access the site via K Street and Makemie Place. Under this scenario, the major access points to the site are expected to be 4<sup>th</sup> Street at I and M Streets, and the two proposed driveways on M Street. A small amount of site traffic is expected to use K Street/Makemie Place, as well as a small amount expected to access the site via K Street/Wesley Place.

The estimated future year trip assignments for the scenario without the 4<sup>th</sup> Street connection are summarized in Figures 29 and 30. The addition of traffic volumes at the intersections increases with proximity to the proposed Waterside Mall driveway locations. Under this scenario, no additional site traffic is expected to be added to 3<sup>rd</sup> or 6<sup>th</sup> Streets between I and M Streets. The intersection of 4<sup>th</sup> and M Streets is expected to see the greatest increase in site traffic of all the studied intersections, with up to 263 trips added during the 2010 AM peak hour and 333 trips during the 2010 PM peak hour. When Waterside Mall is fully redeveloped in 2022, these numbers will increase during the AM and PM peak hours to 339 and 427, respectively. Of the studied intersections on I Street, the intersection of 4<sup>th</sup> and I Streets will see the largest amount of site trips, with 159 during the 2010 AM peak hour and 175 during the 2010 PM peak hour. In 2022, the AM and PM peak hour site traffic volumes are expected to increase to 207 and 229, respectively.

## **TOTAL TRIP ASSIGNMENTS WITH SITE DEVELOPMENT**

In order to forecast the total number of vehicular trips that are expected to traverse the study area intersections during the forecast years of 2010 and 2022, the Study Team added the following layers of traffic volumes:

1. Existing traffic
2. Growth in background traffic
3. Trips generated by other area development
4. PUD site traffic

This scenario assumes that Waterside Mall will be developed with the level of development shown in Table 7. Figures 31 and 32 show total volumes for site development with the proposed vehicular connection of 4<sup>th</sup> Street for 2010 and 2022, respectively.

## **SITE IMPACTS**

The Study Team evaluated the impacts of the PUD site development traffic, with the proposed 4<sup>th</sup> Street connection, on the intersections in the immediate vicinity of the site.

**SELECT TO VIEW:**

***29. Site Traffic for 2010 with 4<sup>th</sup> Street Connection***



**SELECT TO VIEW:**

*30. Site Traffic for 2022 with 4<sup>th</sup> Street Connection*

**SELECT TO VIEW:**

***31. Total (2010) AM and PM Peak Hour Volumes with 4<sup>th</sup> Street Connection***

**SELECT TO VIEW:**

***32. Total (2022) AM and PM Peak Hour Volumes with 4<sup>th</sup> Street Connection***

Site impacts indicate what proportion of the forecast total traffic at a particular intersection is generated by new site traffic. The Study Team calculated the site impacts by dividing the additional site generated traffic by the total forecast traffic at each intersection.

Site impacts of less than five percent are low and generally reflect negligible effects on traffic operations and delays. Site impacts between five and 15 percent are moderate and minor effects on traffic operations and delays are expected at intersections with site impacts at these levels. Site impacts of more than 15 percent are significant and generally result in significant degradation of traffic operations and increased delays. The intersections most affected by the site traffic are those located in the immediate vicinity of the site. Site impacts generally decrease with increase distance to the site that generates the trips.

Table 13 shows that the intersection of 6<sup>th</sup> and I Streets is the only intersection that will experience a significant site impact under this scenario for year 2022 conditions. All other intersections are expected to see low and moderate impact under the studied scenarios for 2010 and 2022 conditions.

**Table 13**  
***Impact of Site Traffic on Area Intersections with 4<sup>th</sup> Street Connection***

Intersection	2010 AM Peak Hour Site Impact	2022 AM Peak Hour Site Impact	2010 PM Peak Hour Site Impact	2022 PM Peak Hour Site Impact
1. 3 <sup>rd</sup> and I Streets	5%	5%	4%	4%
2. 4 <sup>th</sup> and I Streets	9%	11%	8%	9%
3. 6 <sup>th</sup> and I Streets	13%	15%	11%	12%
4. 7 <sup>th</sup> and I Streets	8%	9%	7%	8%
5. 7 <sup>th</sup> Street and Maine Avenue	4%	5%	4%	4%
6. 6 <sup>th</sup> and M Streets	4%	5%	4%	4%
7. 4 <sup>th</sup> and M Streets	6%	7%	7%	7%
8. 3 <sup>rd</sup> and M Streets	4%	5%	5%	5%

## PEDESTRIAN MOVEMENTS

Along with the increase in traffic the redevelopment of Waterside Mall, an increase in pedestrian traffic is anticipated. Based on projected PUD development growth, the Study Team calculated that pedestrian traffic is expected to increase at a rate of 4.1 percent per year.

This scenario, with a vehicular connection along 4<sup>th</sup> Street between M and I Streets, would require pedestrians and vehicles to share transportation facilities and would result in more potential interaction than the alternative with an exclusive pedestrian connection. Under this scenario, there would be an increase in potential conflicts between pedestrians

and vehicles. These potential conflicts, however, can be minimized with the implementation of mitigation measures throughout the connection. These measures should be implemented if a vehicular connection is constructed along 4<sup>th</sup> Street between M and I Streets.

## **FUTURE LEVELS OF SERVICE WITH SITE DEVELOPMENT AND 4<sup>TH</sup> STREET CONNECTION**

The 4<sup>th</sup> Street connection adds an additional leg to the intersection of 4<sup>th</sup> and I Streets, changing intersection operation. Various minor changes were made to the signal operation at this intersection in the traffic model to provide for the additional movements. No changes were made to the existing 21-second pedestrian phase.

As with the scenario without the 4<sup>th</sup> Street connection, this scenario was modeled during the AM and PM peak hours in the years 2010 and 2022. This scenario was also modeled with two eastbound lanes on I Street, as above. Levels of service were calculated using the trips generated and assigned above for the appropriate PUD levels of development at each of these years.

The Study Team used the SimTraffic results to calculate LOS and the delay per vehicle for the intersections in the study area. Table 14 compares the levels of service and delay per vehicle for existing traffic conditions and for total traffic conditions with the 4<sup>th</sup> Street connection for the years 2010 and 2022.

As noted above, without improvements, the study area intersections would operate at gridlock conditions during the peak hours. However, as shown in Table 14, with the operation of I Street between 6<sup>th</sup> and 3<sup>rd</sup> Streets with two eastbound lanes during the peak periods and with a 4<sup>th</sup> Street connection between 4<sup>th</sup> and 6<sup>th</sup> Street, traffic conditions at most of the intersections are adequate for the 2010 and 2022 AM peak scenarios. None of the intersections are expected to operate at LOS F for 2010 AM peak hour conditions. Only the intersection of 3<sup>rd</sup> and I Streets is expected to operate at LOS F for the 2022 AM peak hour scenario. During the 2010 PM peak hour only one of the studied intersections, 4<sup>th</sup> Street at M Street, is expected to operate at LOS F. However, all intersections with the exception of 6<sup>th</sup> and I Streets are expected to operate at LOS F during the PM peak hour for the 2022 scenario. Traffic mitigation measures will be required to reduce congestion. This indicates that improvements would need to be implemented to accommodate the expected 2022 traffic volumes.

**SELECT TO VIEW:**

***Table 14. Level of Service and Delay per Vehicle Comparison – Existing Conditions, 2010 Total Traffic, and 2022 Total Traffic – with 4th Street Vehicular Connection***

## **FUTURE CONDITIONS WITH SITE DEVELOPMENT AND SERVICE ROAD CONNECTION**

In response to citizen suggestions, the Study Team also analyzed 2010 and 2022 scenarios that utilized service roads proposed by the developer as a means of connecting I and M Streets. These service roads, located east and west of 4<sup>th</sup> Street, as shown in Figure 33, are proposed as the driveway points to the site from M Street and continue north to join with Makemie Place in the west and Wesley Place in the east.

Due to insufficient right-of-way to construct adequate roadway width for two-way operation, the western service road would need to operate one-way northbound<sup>1</sup>. The eastern service road could serve both north and southbound traffic.

A full analysis of this option, including trip distribution and assignment, as well as SYNCHRO/SimTraffic analysis, was performed. The results of this analysis show that these service roads are not viable options to connect I and M Streets. Because of their proximity to 3<sup>rd</sup> and 6<sup>th</sup> Streets, the ability of the service roads to divert through traffic from 3<sup>rd</sup> and 6<sup>th</sup> Streets is very limited.

Furthermore, the proximity of the service roads to 3<sup>rd</sup> Street and 6<sup>th</sup> Street precludes the installation of traffic signals at the intersections of the service roads with M and I Streets. The SimTraffic modeling shows that the lack of a signalized access point at the intersections of the eastern access route with I and M Streets, combined with high traffic volumes, makes left turns from the access road very difficult. The high traffic volumes and congestion on I Street also preclude the installation of an all-way stop sign at the intersections of the service roads with I Street. Additionally, the proposed geometry of the eastern service road is not adequate for high volumes of through traffic. Finally, this access road would do nothing to reduce traffic volumes on I Street east of 4<sup>th</sup> Street.

The SimTraffic modeling indicates that northbound queues would extend the full length of the service roadway from I Street to M Street under the 2010 and 2022 scenarios. Additionally, vehicle delays at the intersections of 3<sup>rd</sup> and I Streets and 3<sup>rd</sup> and M Streets, as shown in Table 15, are considerably worse under this scenario than under the scenario with a 4<sup>th</sup> Street vehicular connection.

With regards to the western access roadway, the lack of a signalized left turn from M Street into the site would encourage drivers to continue to use I Street as a means of accessing the western portion of the site. As a result, no reduction of site traffic on I Street would occur.

While the service roadways alone do not represent a solution to traffic congestion in the study area, they will provide additional capacity if used in conjunction with the proposed 4<sup>th</sup> Street vehicular connection.

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<sup>1</sup> Based on plans provided by the developer of Waterside Mall, this service roadway is expected to be 16 feet wide at its narrowest point.

**SELECT TO VIEW:**

***33. Scenario with Service Road Connections***



**SELECT TO VIEW:**

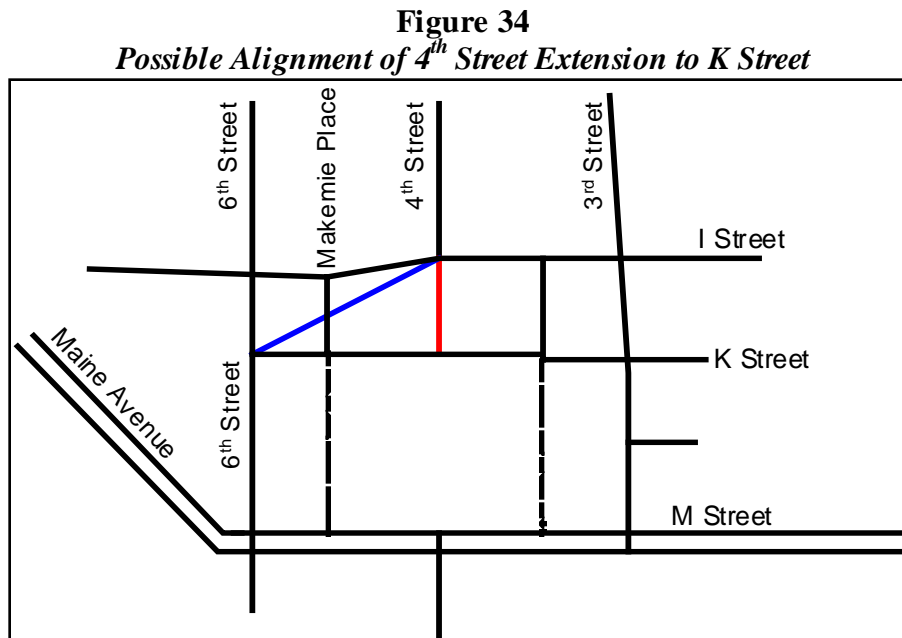
***Table 15. Level of Service and Delay per Vehicle Comparison – Existing Conditions, 2010 Total Traffic, and 2022 Total Traffic – Service Road Scenario***

## **OTHER ALTERNATIVES**

The following scenarios were analyzed in response to citizen comments.

### **CONNECTING 4<sup>TH</sup> STREET TO K STREET**

This scenario explores the feasibility of constructing an extension of 4<sup>th</sup> Street from I Street to K Street, shown in red in Figure 34, or directly to the intersection of 6<sup>th</sup> Street and K Street, as shown in blue. Waterside Mall service roads are shown as dashed lines. The diagonal connection directly to 6<sup>th</sup> and K Streets is not feasible due to geometric constraints. Therefore, based on analysis of available resources, the most likely scenario would be to extend 4<sup>th</sup> Street southward from its current terminus at I Street to form a T-intersection with K Street. Traffic bound for Waterside Mall would access the mall at the intersection of Makemie Place and K Street. Through traffic could continue to 6<sup>th</sup> Street.



There are two potential outcomes associated with this alternative. The first assumes that a considerable amount of through traffic would access M Street via this extension of 4<sup>th</sup> Street and 6<sup>th</sup> Street. The second potential outcome would be that most through traffic would avoid using the 4<sup>th</sup> Street extension and would continue to use 3<sup>rd</sup> Street to reach points south and east of the intersection of 4<sup>th</sup> Street and M Street.

#### **Outcome 1 – Through Traffic Uses the 4<sup>th</sup> Street Extension**

Based on projected 2022 traffic volumes and patterns used elsewhere in this study, up to approximately 300 vehicles could be expected to use this vehicular connection during the AM peak hour. Of these 300, approximately 250 vehicles are expected to be through traffic that would then turn left onto 6<sup>th</sup> Street at the intersection with Makemie Place. Unsignalized intersection capacity analysis, based on procedures outlined in the Highway

Capacity Manual (Transportation Research Board, 2000), indicates that westbound traffic on Makemie Place would operate at LOS F, with approximately 70 seconds of delay per vehicle. This delay would create long queues extending into the Waterside Mall site and would affect internal site circulation.

Based on criteria found in §4C.04 of the *Manual on Uniform Traffic Control Devices* (USDOT, December 2000), the Study Team evaluated the intersection of 6<sup>th</sup> Street and Makemie Place to determine if signalization warrants were met. §4C.04 is known as “Warrant 3, Peak Hour.” The MUTCD states:

“The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. This signal warrant shall be applied only in unusual cases. Such cases include, but are not limited to, office complexes...that attract or discharge large numbers of vehicles over a short time.

“The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:

1. The total stopped time delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach, and
2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and
3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.”

Based on projected AM 2022 volumes at the intersection of 6<sup>th</sup> Street and Makemie Place:

**A1.** Total stopped delay on Makemie Place (the minor street) = 5.2 hours (268 vehicles x 70.1 seconds/vehicle). *Criteria is met*

**A2.** Volume on the minor street = 268 vehicles. *Criteria is met*

**A3.** Total entering volume = 839. *Criteria is met*

As all three criteria listed in category A are met, a traffic signal would be warranted at this intersection. However, close proximity to the signalized intersection of 6<sup>th</sup> and I Streets precludes a signal installation at this intersection. As a result, the projected poor levels of service and high delays would remain.

The additional traffic added to the intersection of 6<sup>th</sup> Street and Makemie Place would then require an increased amount of southbound green time at the signal of 6<sup>th</sup> and M Streets, taking time away from M Street and increasing delay in the east-west direction. Through traffic bound for the South Capitol Street area would also pass through the intersection of 4<sup>th</sup> and M Streets, requiring additional green time for M Street. The

outcome of changing the signal timing at this intersection would be greater delays for northbound traffic on the southern portion of 4<sup>th</sup> Street.

### **Outcome 2 – Through Traffic Uses 3<sup>rd</sup> Street**

While Outcome 1 is a possible result of extending 4<sup>th</sup> Street to K Street, a more likely result can be expected based on existing and projected traffic patterns. The field observations and data collected for this study indicates that through traffic prefers to travel east on I Street to access M Street, indicating that this extension of 4<sup>th</sup> Street would not be heavily used by through traffic. Additionally, a large percentage of other area development traffic is destined for the area east of South Capitol Street. A more likely outcome of connecting 4<sup>th</sup> Street to 6<sup>th</sup> Street is that through traffic, particularly traffic bound for the South Capitol Street area, would continue to use I and 3<sup>rd</sup> Streets to access M Street. Under that scenario, no relief would be provided to these residential streets and the extension of 4<sup>th</sup> Street would primarily serve as an access point to Waterside Mall.

To summarize, extending 4<sup>th</sup> Street to connect with K Street would have a detrimental effect on traffic operations in and around Waterside Mall. Relief would not be provided to I and M Streets, and traffic volumes would increase on 6<sup>th</sup> Street. This scenario would also be expected to increase traffic volume and congestion on M Street.

### **OPERATING THE SERVICE ROADS AS A ONE-WAY PAIR**

This scenario assumes that the service roads proposed by the developer and discussed above would operate as a one-way pair; i.e., one would run one-way northbound, and the other would run one-way southbound.

The analysis indicates that eastbound volumes on M Street during the PM peak hour (under all alternatives) are too high to allow for drivers to exit the driveway west of 4<sup>th</sup> Street and turn left onto eastbound M Street. Therefore the driveway west of 4<sup>th</sup> Street would have to be constructed as a right-in or a right-out driveway only. If the western service roadway were to run northbound, only traffic accessing the site from westbound M Street would be able to use it. Eastbound traffic on M Street wishing to go to Waterside Mall would need to turn left on 6<sup>th</sup> Street, right on I Street, right on 3<sup>rd</sup> Street and right on M Street. If this roadway were to run southbound, vehicles would only be able to exit onto westbound M Street. This increased travel will increase traffic congestion in the study area.

This alternative would do nothing to decrease traffic on I and 3<sup>rd</sup> Streets. Additionally, operating the service roads as a one-way pair would result in a large number of left turns at the unsignalized intersections they form with I Street. Due to the projected traffic volumes on I Street, long queues can be expected both on I Street and within the Waterside Mall site. The high traffic volumes and congestion on I Street also preclude the installation of an all-way stop sign at the intersections of the service roads with I Street.

Finally, the extra volume crossing 4<sup>th</sup> Street on M Street would require additional green time for M Street at this already congested intersection. The result would be increased queues for northbound 4<sup>th</sup> Street traffic.

In conclusion, this scenario would not operate as a viable solution to traffic congestion in and around Waterside Mall due to the limited capacity of the service roads, maintenance of high traffic volumes on I Street and increased congestion and volume on M Street.

### **OPERATING 3<sup>RD</sup> AND 6<sup>TH</sup> STREETS AS A ONE-WAY PAIR**

This scenario assumes that 3<sup>rd</sup> and 6<sup>th</sup> Street would operate as a one-way pair between I and M Streets; i.e., one would run one-way northbound and the other would run one-way southbound.

Access to Waterside Mall would not be improved under this alternative; numerous left turns at unsignalized intersections would still be required. Additional green time at M Street would be required on whichever roadway ran southbound, taking green time away from the already-congested M Street. Additionally, the extra volume crossing 4<sup>th</sup> Street on M Street would require additional green time for M Street at this already congested intersection. The result would be increased queues for northbound 4<sup>th</sup> Street traffic.

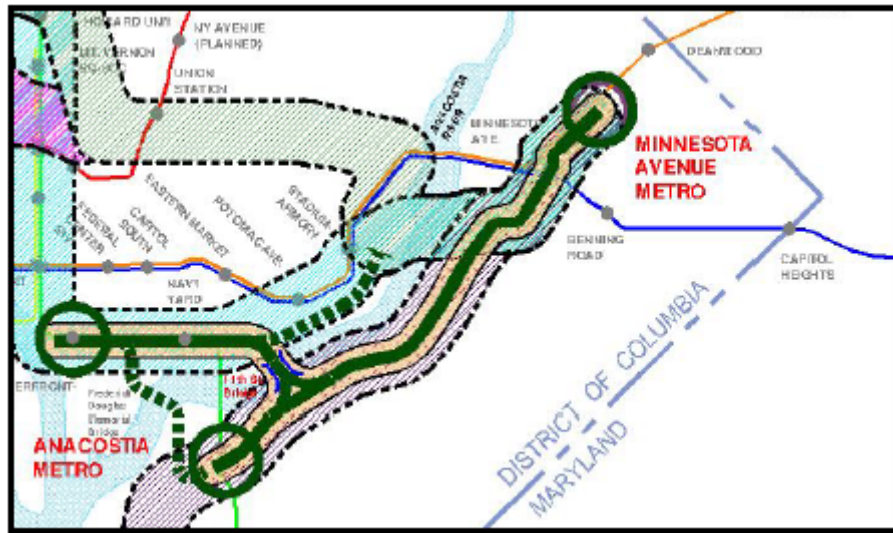
Operating these roadways as a one-way pair would fundamentally change the nature of 3<sup>rd</sup> and 6<sup>th</sup> Streets from local, residential streets to heavily traveled arterials. In addition, it would decrease pedestrian safety due to increased vehicle speeds on the one-way streets.

The Study Team does not recommend the implementation of this alternative due to the effect of changing 3<sup>rd</sup> and 6<sup>th</sup> Streets from residential streets to arterials. Additionally, increased speeds and decreased safety could be expected, as well as additional volume and congestion throughout the study area.

## FUTURE PUBLIC TRANSPORTATION

WMATA is currently undertaking a study exploring the possibility of various alternative forms of public transit, including light rail transit (LRT) in different locations throughout the city. Their currently proposed LRT starter route would run east on Maine Avenue/M Street from the Southwest Waterfront and cross the Anacostia River to the Anacostia and Minnesota Avenue Metro stations, as shown in Figure 35. This starter route is expected to be operational by 2010.

**Figure 35**  
*Proposed LRT Starter Line – Anacostia Waterfront to Minnesota Ave.*



Trolleys are the most likely mode of transportation to be implemented in this corridor. These trolleys would share one lane with motor vehicles in each direction of Maine Avenue and M Street. Trolleys would require no exclusive right-of-way, nor would there be any loss of parking or sidewalks throughout the study area. At the current time, no information is available concerning station spacing or headways.

In the traffic analysis and modeling, no adjustments were made to account for the implementation of this transit mode. The positive and negative effects of the trolley route on vehicular traffic will be offsetting. While there will be increased friction on Maine Avenue and M Street due to trolley stops and vehicles passing the trolleys, there will be a decrease in the number of vehicular trips due to the increased use of the transit mode.

WMATA has received requests for an extension of the N22 line from the Washington Navy Yard to the Waterside Mall area. This extension would provide access to the Eastern Market for Southwest residents. The Study Team recommends that this extension be tested for a period of six months once funding is secured.

At this time, WMATA has no plans for bus service on the proposed 4<sup>th</sup> Street vehicular connection. However, should service be implemented, the proposed width of the roadway is adequate for bus operation. If the decision is made to implement bus service, a bus pad would need to be constructed adjacent to the Metro.